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D3.3 – Advanced Methods and Tools for User Interaction Automation

Executive Summary: This deliverable describes the advancements achieved during the second project year in the design and development of the SIMPATICO components for interaction automation. All of the prototypes are described and their interfaces and future plans for their integration and deployment in the SIMPATICO pilots outlined.

WP: WP3 - Front-end interaction and enrichment

Author(s): Raúl Santos de la Cámara (HIB), Tamara Martín Wanton (HIB), Enrique Sanz (DEUSTO), Koldo Zabaleta (DEUSTO), Diego López de Ipiña (DEUSTO), Giuseppe di Modica (BENG)

Editor: Raúl Santos de la Cámara (HIB)

Leading Partner: HI Iberia (HIB)

Participating Partners: DEUSTO, BENG

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Statement of originality

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

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Glossary

API	Application Programmer's Interface
AST	Authoring Support Tool
CDV	Citizen Data Vault
CPD	Collaborative Procedure Designer
CTZ	Citizenpedia
DA	Data Analysis
DOM	Document Object Model
eSM	e-Service Monitor
HTTP	Hypertext Transfer Protocol
IFE	Interactive Front-end
IN	Interactive Phase
KPI	Key Performance Indicator
LOG	Interaction Log (module)
LS	Landing Screen Phase
PA	Public Administration
QAE	Question Answering Engine
REST	Representational State Transfer
SF	Session Feedback
SUS	System Usability Scale
TAE	Text Adaptation Engine
UP	User Profile
UPM	User Profile Manager
URL	Uniform Resource Locator
WAE	Workflow Adaptation Engine
WP	Work Package

Executive summary

This document is the deliverable “**D3.2 – Basic methods and tools for user interaction automation**” of the European project “SIMPATICO - SIMplifying the interaction with Public Administration Through Information technology for Citizens and cOmpanies” (hereinafter also referred to as “**SIMPATICO**”, project reference: 692819).

SIMPATICO addresses a strategic challenge towards the **innovation and modernization of the public sector**: the need to offer a more efficient and more effective experience to companies and citizens in their daily interaction with Public Administration (PA) by (i) offering a personalized delivery of PA online services; (ii) enabling a better comprehension of the complex processes and documents (forms, regulations, etc.) behind these services; (iii) engaging them to improve the administration processes and services. SIMPATICO's goal is **to improve the experience of citizens and companies in their daily interactions with the public administration** by providing a personalized delivery of **e-services** based on advanced cognitive system technologies and by promoting an active engagement of people for the continuous improvement of the interaction with these services.

This document deliverable reports the work undertaken in SIMPATICO for WP3 (“Front-end interaction and enrichment”) in the course of the project period spanning from month 12 to month 24. In this period, the **second version of the SIMPATICO components for interaction automation were designed, implemented and preliminarily integrated**. The key results are the updated **interaction data model** for the SIMPATICO platform and a summary of the developments of each of the components developed in WP3 (**Interaction Front-End, Interaction Log, Session Feedback, Data Analysis and e-Service Monitor**). All of the prototypes are described and their interfaces and future plans for their integration and deployment in the SIMPATICO pilots outlined.

The current document is formally part of the work undertaken in the process of the tasks T3.2 (“Interactive front-end”), T3.3 (“Data/log analysis”) and T3.4 (“Enrichment engine”). However, slight changes and revisions of the work undertaken in task T3.1 (“Modelling of interactions”) during the period M12-M24 has been incorporated into this deliverable.

1 Design features

The current D3.3 is the third deliverable of work package WP3 in SIMPATICO. It collects the developments of the participants in the Work Package until the project month 24.

The goals of this deliverable are as follows:

- Refining the interaction model that is used to build the user- and civil servant-facing components of the SIMPATICO architecture. The model was defined for the M12 components and there has been significant changes in these since then. Thus, a process of rework of the model is opened in the period leading to this deliverable that is then reported in section 1.1
- Documenting the design of the interactive components. These have changed moderately since M12 (the most significant change being the fusion of the Enrichment Engine and the Dashboard, and partial realignments of the LOG and Data Analysis. This will be documented in section 1.2.
- Detailing the final designs for the components themselves: functionality, APIs, future plans. This is done in sections 2-6 of this document. Mainly this is an iterative update over the components delivered in (Santos de la Cámara, D3.2 Basic Methods and Tools for User Interaction Automation 2017).
- Finally, providing the first indication of future steps in WP3 following the delivery of this document. The final release of the work package is at the end of the project in M36 so a preliminary plan of the scope of the remaining work and targets for this will be delivered in the section 7.

We then start this section by assessing the changes in the SIMPATICO architecture that are documented in deliverable (Filograna 2017) D5.2. The final status of the architecture is as follows:

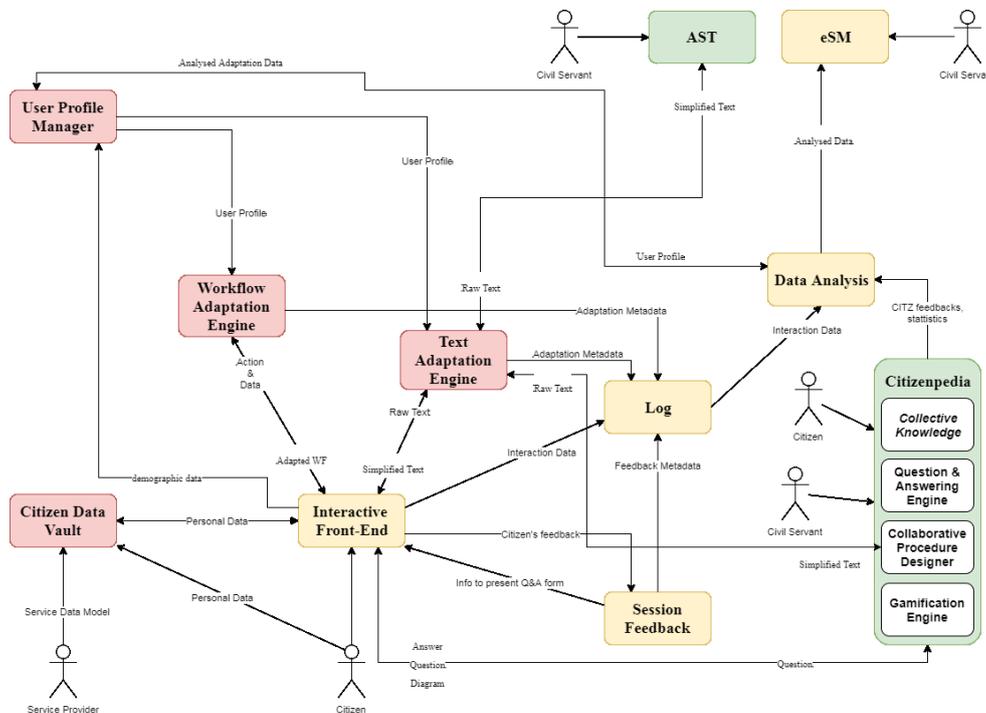


Figure 1 – SIMPATICO Architecture

Upon inspection, we can see significant changes for the WP3 intents:

- A module (Enrichment Engine) has been removed. We decided to integrate the civil-servant facing, interaction-oriented functionalities of the Dashboard with the EE into the e-Service Monitor (eSM). This module was also subject to some co-design activities along with Civil Servants during the execution of the Evaluation activities in autumn 2017. This is further documented in section 1.2.5 of this document.
- The role of Data Analysis and how it cooperates with the Interaction Log was further clarified. This new relationship is one of very deep cooperation (Data Analysis provides extra functionalities, but on a software engineering level both modules work as a single unit) and it is better explained in sections 3 and 5.
- The User Profile Manager module will be developed and delivered in the current iteration. UPM requires interactions with the LOG and the DA modules for its functions. Thus, extra APIs for these modules will be created that document these new analysis techniques. This will be outlined in section 5.

Additionally, two modules, (Authoring Support tool Tool - AST User Profile Manager - UPM) are new from the first version of the architecture. They will be described in documents for WP2 of the project during the current M24 release.

1.1 Interaction model updates

The proposed updated interaction model for SIMPATICO is as follows:

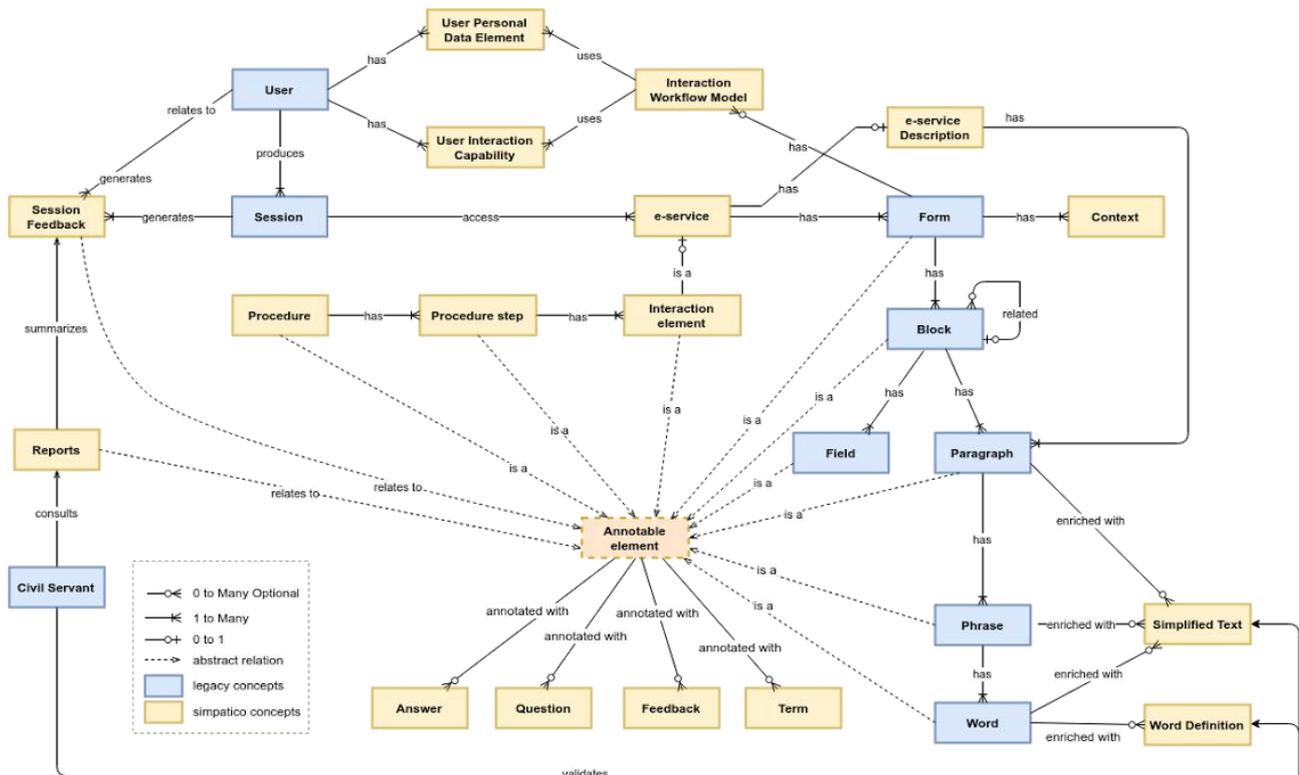


Figure 2 – SIMPATICO e-service updated interaction model

The Figure 2 is the updated interaction model for SIMPATICO that integrates the new interactions with WP3 components not delivered in past deliverables in SIMPATICO.

Let us summarize the new blocks, their differences and how they relate to the modules in the architecture.

- The core change is the addition of elements to implement a feedback loop in the model. 'Session Feedback' is collected by asking the 'User' (that's why Users *generate* Feedback) and also by analysing their activities without explicit asking them (and that's why Sessions *generate* Session Feedback).
- Session Feedback is then used to generate intelligence for the Civil Servant, which we call in the model 'Reports'. These are pieces of information (displayed to Civil Servant in the eSM and AST modules present in Figure 1).
- In order for some of the Session Feedback elements to have sense they need to be linked to particular pieces of information in the e-service. That is why both the Session Feedback and the Reports need to refer to the Annotable Elements in the model. For example, if a user makes a Question it needs to refer for example to a confusing Paragraph in the e-service.
- For the purpose of the WP4, and specifically of the Collaborative Procedure Design component, the 'Interaction Element' and the 'Feedback' are introduced. The former models an Citizen-PA interaction happening in the course an administrative procedure, the latter represents a suggestions that citizens can provide and attach to any of the 'Annotable elements' that e-services and administrative procedures are composed of.
- Finally, the AST module needs that the interaction of the Civil Servants can be reflected in the Simplified or Defined Texts that are part of the interaction for the citizens. That is reflected in the long feedback connecting both worlds at the bottom of the picture.

In the next sections we discuss the implementation of these modules and how they put to use in different implementations parts of this conceptual model.

1.2 Component high level designs

From the architecture presented in Figure 1 we can see how the components associated with the WP3 are: Interactive Front-End, Session Feedback, Interaction Log, Data Analysis and e-Service Monitor. The first version of the components (save for the new eSM) was detailed in deliverable D3.2 released at project month 12. That version of the components was then deployed and used in the pre-evaluation phase (M14-M15) and the first evaluation cycle (M15-M20). The concrete results of these tests are discussed in deliverable D6.5(Pistore, D6.5 SIMPATICO Evaluation Report v1 2017).

As we did in D3.2, we will use this subsection to discuss the high level design features of the components. Overall, the guiding principle is to refine the functionality of the v1 components and, where applicable, add new functionality either to support the components that were not fully used in the first iteration such as the User Profile Manager or barely used due to lack of end-user requirements such as the Data Analysis or the e-Service Monitor.

1.2.1 Interactive Front End

IFE has been updated with just minor changes since the implementation presented in D3.2. The design features outlined in that deliverable (e.g., use of Javascript that works along with legacy code of the e-services) remains unchanged.

1.2.2 Interactive Log

The design of the interactive Log has suffered just maintenance changes compared to the first release of the system in M12 that don't change the basic design presented in D3.2. The required new features don't change the design principles or technologies but rather are extensions of the APIs and other functionalities built on top of the existing design.

1.2.3 Session Feedback

Session Feedback is a key component in gathering the feedback from the users after each interaction session with the e-service has ended. As implied in the interaction model in section 1.1, for each Session two items of feedback are generated: one is based on the session itself by the automatic analysis of captured metadata of the session (e.g., session duration, success or failure in the completion of the service) while the other part of the feedback is provided directly by the user.

This 'explicit' feedback was indeed captured via different means. During the experiments using the first iteration of SIMPATICO, participants were presented with a questionnaire prior to their hands-on session with the technology (to gather demographic data, etc.). Then the user performed the SIMPATICO session. After this, the user was presented with another questionnaire to provide in-depth analysis of aspect such as the usability, the language in the questions, etc. based on standardized questionnaires such as the SUS (System Usability Scale)(Brooke 1996).

The process is depicted in Figure 3 and it was detected during the experiments that the change in context and tools was jarring for users who were often confused about answering two feedback questionnaires consecutively (SF and then the Google-forms based questionnaire for detailed feedback).



Figure 3 – SIMPATICO experiments questionnaires and feedback gathering.

It was thus decided to simplify the process by unifying the latter two questionnaires in a longer Session Feedback. This was then incorporated into the design. The following Figure 4 represents the current state of design for the session feedback component:

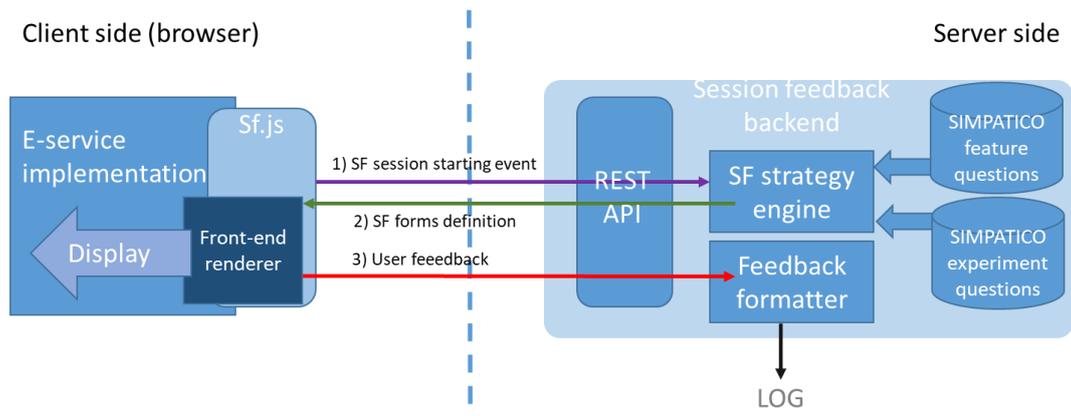


Figure 4 – Session Feedback high level design

Session Feedback now is able to seamlessly incorporate questions from both the evaluation of SIMPATICO features in the past session (same as in the Y1 release) but now also including questions directly related to the experiment if necessary. Note the two distinct sets of questions fed to the strategy engine in the Figure 4.

For this, a system that loads the questions and logic to show them from configuration files is implemented so that the backend of the Session Feedback reads all of the pertinent questions from it (in different languages, for different session events, etc.) and then the strategy engine decides upon the presentation of them in the front-end. The exact design of the configuration file is under development as of the writing of this module.

Other change to the session feedback at this stage is the transition of technology for presentation, from a JQuery based modal dialog into an interactive form more suited for cross-device presentation. This is due to the problematic usability challenges posed by modal dialog forms in mobile devices such as smartphones that, while not considered in depth in SIMPATICO, are very much a focus of the offerings by PAs for their future e-services.

1.2.4 Data Analysis

Data Analysis (DA) takes raw data stored in the LOG and processes it to achieve more detailed insights that can be communicated later to the civil servants so that they have the best available information.

From the first version of the Data Analysis released in the first year of SIMPATICO, we have implemented the following changes:

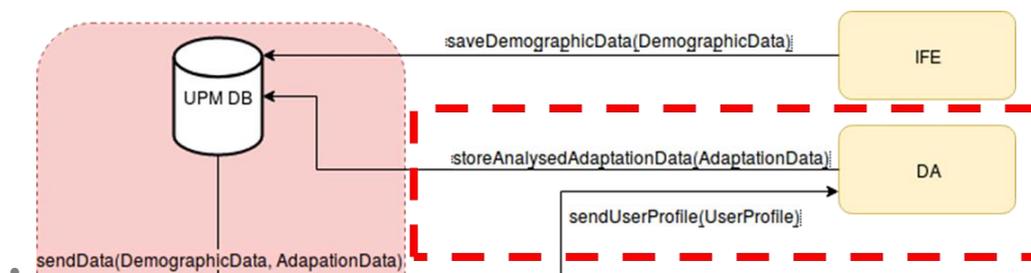


Figure 5 – Data Analysis and UPM interface

- *New APIs to connect to the User Profile Manager.* This new phase 2 component requires data from the interaction of users so that a user profile to improve the text simplifications can be built.
- *Addition of new APIs to automatically calculate KPIs* for the project and the e-services. During the execution for the first phase pilots, it was detected that the values for the project KPIs (e.g., improvement in e-service completion rates for citizens using SIMPATICO versus citizens using the legacy services) could be easily calculated. Thus, primitives for the analysis of such KPIs have been included into the APIs for the Data Analysis. For example, see the API call `/percentage-complete-autonomously` in section 5.2.
- *Filtering and other new processing primitives based on the interviews with the end users.* During the interviews with the various end users during the execution of the pilots (see for example the summary of changes derived from the civil servants interviews in section 1.2.5) several requests for functionalities that require data analysis were discovered. Examples to this are the filtering mechanisms that are needed in the new eSM (e.g., geographic filtering, demographic filtering). This will be implemented through new calls to the DA API that fire new analyses.

Regarding analysis primitives for displaying new information in the eSM and the AST, the new features to be incorporated into the DA will be depending on each of the pilots' exact needs for the civil servants. As of the writing of this document, the work in this regard is still ongoing as we have focused on the provision of an adequate platform that can be then be extended with these analysis features. As an example, in the table below we can see the first release of requirements for the Trento pilot:

Table 1 – DA draft requirements for the Trento pilot

<p>About the procedure</p> <ul style="list-style-type: none"> • #users for each step of the procedure managed through an e-service; <ul style="list-style-type: none"> • #questions about each step of the procedure; • #answers about each step of the procedure; • #users who use Q&A tool; • #text simplification requests. <p>About each e-service</p> <ul style="list-style-type: none"> • #users starting the e-service; • #users completing the e-service; • Average completion time of the e-service • #questions about the e-service; <ul style="list-style-type: none"> • #answers about the e-service; • #users who use Q&A tool; • #text simplification requests. <p>About each e-service form</p> <ul style="list-style-type: none"> • #users starting the e-service form; • #users completing the e-service form; • Average completion time of the e-service form • #questions about the e-service form; <ul style="list-style-type: none"> • #answers about the e-service form; • #users who use Q&A tool within the e-service form;

- #user who use WAE.

About each block of the e-service form

- Average completion time of the block
- #questions about the block;
 - #answers about the block;
 - #users who use Q&A tool within the block;

The full list of such DA requirements will be described in detail in D3.4.

1.2.5 e-Service Monitor

The e-Service Monitor (henceforth eSM) is the interactive module that enables civil servants to monitor the status of the service and the findings achieved through the analytics collected in the SIMPATICO tools (e.g., through the SF). This module is a continuation of ideas that were implemented in the 1st evaluation phase of SIMPATICO extracted from the old modules Enrichment Engine and Dashboard.

During the 1st phase a first design has been provided based on requirements from the end-users (civil servants that would be using the system) and the technical capabilities that were implemented by the SIMPATICO development team.

The result of this was evaluated with civil servants in Galicia in October 2017 and the results were mixed. Due to this, it was decided that the next evolution would require a better design in which participation of the end-users was put to action. For this, a co-design workshop and focus group was designed and held on October 25th 2017 in Santiago de Compostela with a number of Xunta de Galicia civil servants. The activity was reported in detail in D6.5 (Pistore, D6.5 SIMPATICO Evaluation Report v1 2017).

Here we will summarize the results and detail the designs produced. The methodology followed was to produce low fidelity mock-ups along with the intended end-users so that the basic functionalities and their layout could be useful for the users.

It was decided to group the results in three main 'screens' or sections: (a) general statistics of usage, (b) question and answer functionalities and (c) text simplification functionalities. We will now detail the results for the co-designs of these sections.

General statistics

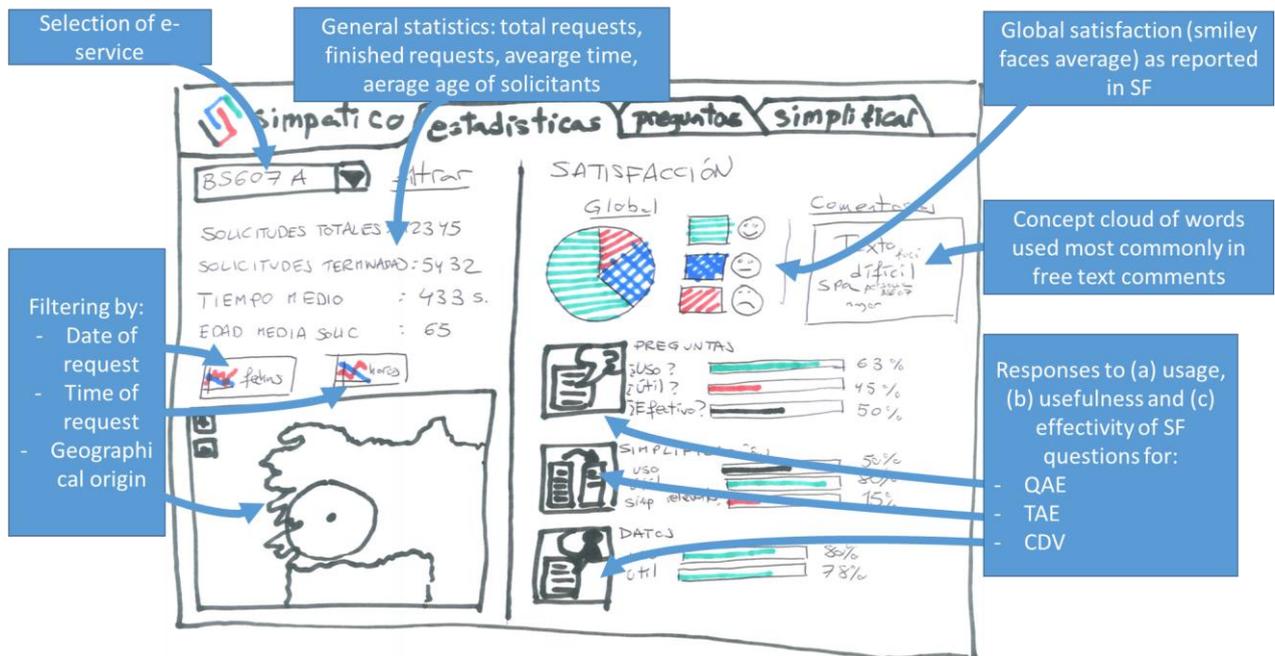


Figure 6 – e-Service Monitor Mockup: statistics

The first choice of monitoring data for end-users is the 'statistics' summary. This tries to convey the more critical statistics gathered in the SIMPATICO platform for a given e-service.

The key aspects highlighted by the civil servants were:

- General usage statistics are useful and global numbers are the most important. Useful figures are for example the percentage of users that get through the whole e-service process and get to the goal and the average time that users spend filling out forms.
- It is essential to be able to filter out the usage of the platform by demographics such as the age, the geographical location, the income bracket, etc.
- The usage of SIMPATICO features was deemed by the civil servants as less relevant for their day to day work (it is important to note that the same civil servants involved in the focus group were test users of the citizen SIMPATICO system so they knew its capacities). It was nonetheless remarked that a very simple visual match of the answers to the functionality in question should be present. For this, in the mock-up the icons of 'QAE', 'TAE' and 'CDV' that were used in the IFE were sketched so that it was easier to relate the results and the functionalities.

QAE/Citizenpedia monitor:

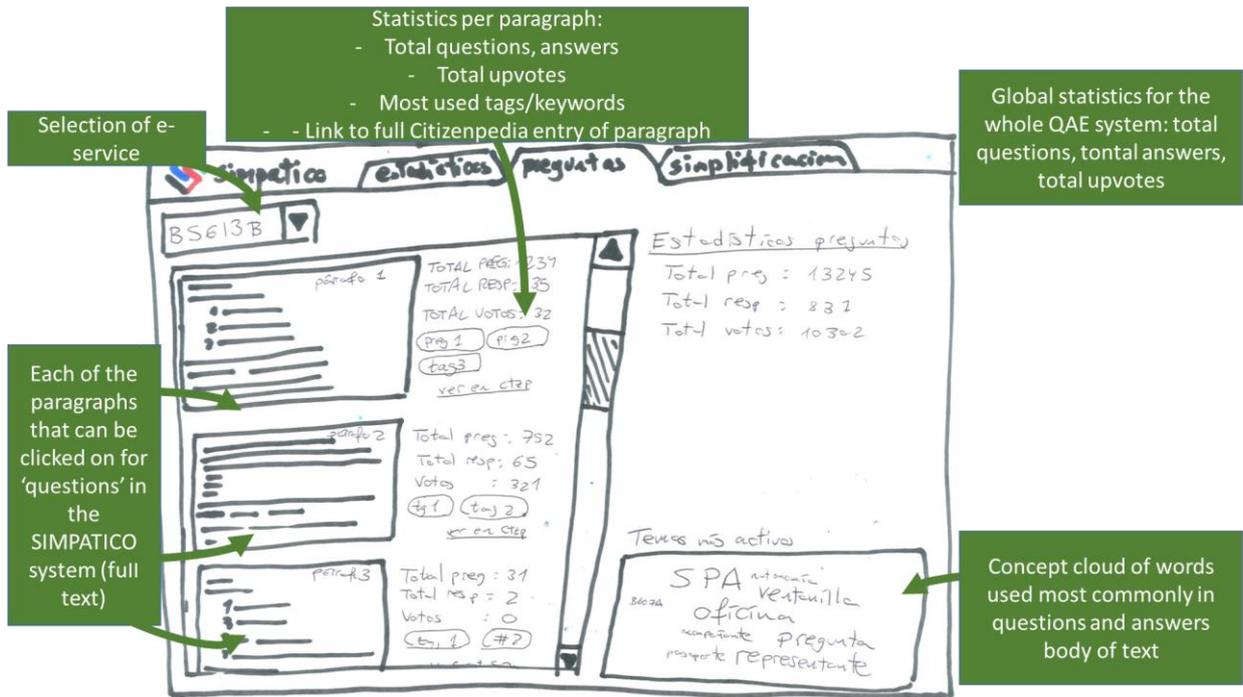


Figure 7 – e-Service Monitor Mock-up: QAE

TAE monitor:

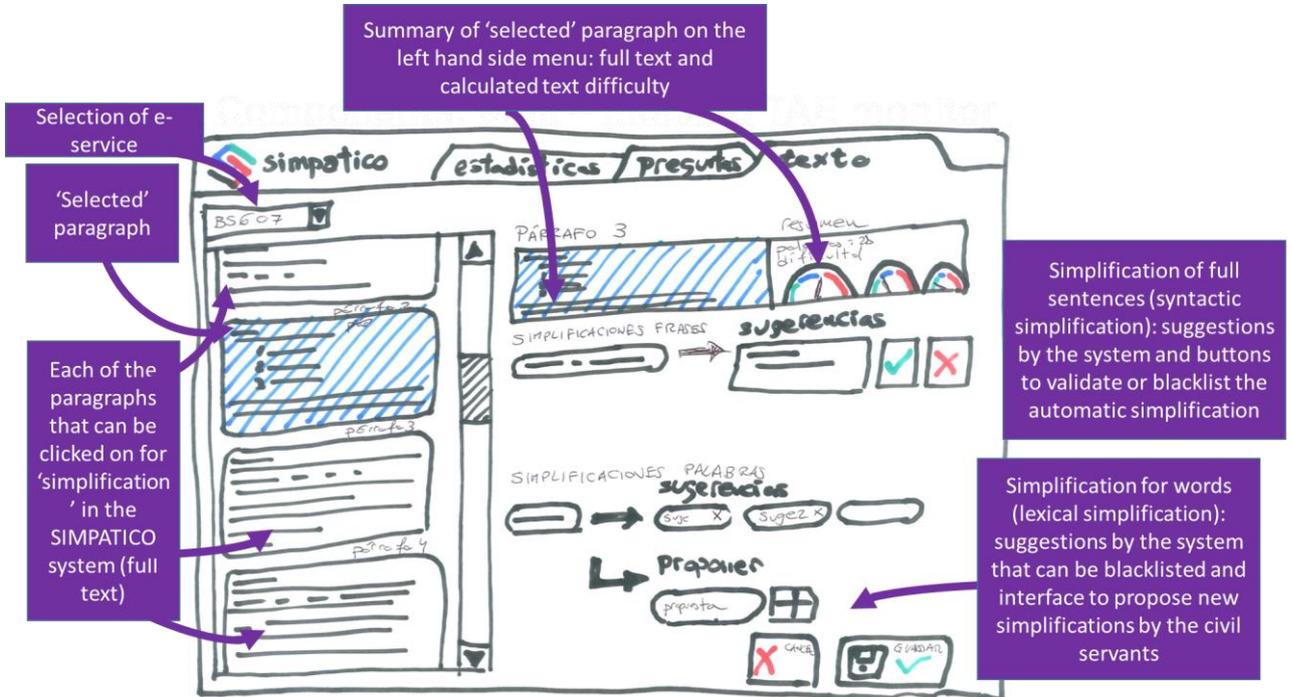


Figure 8 – e-Service Monitor Mock-up: TAE

Both the QAE and the TAE share a ‘paragraph-oriented’ interaction approach that mirrors the strategy chosen in the IFE to signal points where the users can make questions or request simplifications.



Figure 9 – Paragraph-based TAE activation in Galicia pilot with paragraph selector highlighted

As we can see in Figure 9, paragraphs are marked so that simplification is requested. This maps with our decomposition of e-services into ‘Blocks’ and ‘Paragraphs’ in the Interaction data model. Thus, when we display the results of the interaction of users in the eSM we have to use the same building blocks. For that, both in the QAE (Figure 7) and the TAE (Figure 8) the leftmost panel is just displaying, in sequential order, the full text of those paragraphs so that civil servants can track where the given results (statistics, simplifications) apply.

In the QAE two distinct levels of statistics are displayed: for each one of the paragraphs, a summary of the numbers of questions, answers and *upvotes* to those answers is provided. This is done on the left panel, in line with each one of the available paragraphs. On the right hand side of the monitoring area, a general display is presented with global statistics (total number of questions, answers and *upvotes*, adding up all of the paragraphs) and a concept cloud with the most relevant topics discussed (where larger words correspond to more activity in that particular word).

For the TAE, there is a similar per-paragraph presentation of the data but also including some interactive features to let the civil servants have an influence in the selection of alternative words and simplified sentences as hinted in the interaction model in section 1.1.

Thus, for each paragraph the automatically calculated simplifications are presented to the civil servant and an intuitive interface is presented to validate or disregard that particular simplification. In addition, and for the words only, suggestions are possible by the civil servant. The suggestions provided by the servant will be used alongside automatic simplifications that have not been disregarded for future sessions.

After the design of these preliminary mock-ups, the results are shared with WP2 (for elements regarding simplification feedback) and WP4 (for the QAE monitor) so that the required functionalities to enable these features are built into the components.

At the WP3 level, what remains is to implement the front-end of the eSM. Technically, a number of decisions were made after the analysis of the design output. It was decided for example to transition



from the Spring framework to node.js for the front-end development. This was due to node.js being substantially more lightweight for the intended results and the availability of more expertise during the SIMPATICO execution for the latter programming framework.

2 Interactive Front-End

2.1 Short summary of key functionality and updates over version v1

The Interactive Front-End (IFE) component provides the following functionalities. Some of them fulfil several requirements defined in the deliverable D3.1 (Santos de la Cámara, D3.1 User interactions modelling and design 2016), section 2.3.2:

- *Connections via REST API*: The IFE is able to make GET/POST/... RESTful request in order to communicate with other components of the SIMPATICO platform. This functionality fulfils requirement IFE.1. **[Already accomplished in D3.2]**
- *User text capture*: The IFE is capable of capturing the text that a user has selected in a web form. This text shall be sent to other SIMPATICO components, e.g., to retrieve a simplified version of it. This functionality fulfils requirement IFE.2. **[Already accomplished in D3.2]**
- *Modify text in a web form without page refresh*: The IFE is able to modify the DOM of a web form and modify text within it, without causing an entire refresh of the web form. The aim is to maintain a successful user experience. This functionality fulfils requirement IFE.3. **[Already accomplished in D3.2]**
- *Connection with Citizenpedia*: The IFE enables to fetch questions, answers and comments posted in the Citizenpedia (WP4) related to the e-service that is being visualized automatically. It also enables to post questions in the Citizenpedia related to the current e-service in an easy manner. This functionality fulfils requirement IFE.4 and IFE.5. **[Enhanced]**
- *Capture usability data*: The IFE can record interaction data, e.g. the time spent in each web form, the number of clicks per item, etc. This is achieved by capturing JavaScript events (e.g. onClick). This functionality fulfils requirement IFE.6. All these events haven been used in order to check if the users finished the procedure or, in case that they don't, analyse when and where the procedure was abandoned. **[Already accomplished in D3.2]**
- *Ease of integration with web browsers*: The IFE has been implemented as a JavaScript library that interacts through JavaScript events. This approach is browser-agnostic and eases the integration with popular browser in many of their recent versions. This functionality fulfils requirement IFE.7. **[Already accomplished in D3.2]**
- *Ease of use*: The IFE has been implemented as a toolbar that appears on top of the legacy e-service. This toolbar contains a reduced set of icons (three to four) that enables the user to access the functionalities of the SIMPATICO platform. This functionality fulfils requirement IFE.4 and IFE.8. An iterative method is being used to evaluate and enhance the usability of the IFE toolbar. After the pilots being held with each partner, some changes to the style and aspect of the toolbar have been made to improve the usability and make it more self-explanatory. **[Enhanced]**

2.2 Interfaces

This component exposes no interface, as it is the software piece that exposes the user interface of the SIMPATICO platform. However, it is a client of several components (see Figure 10).

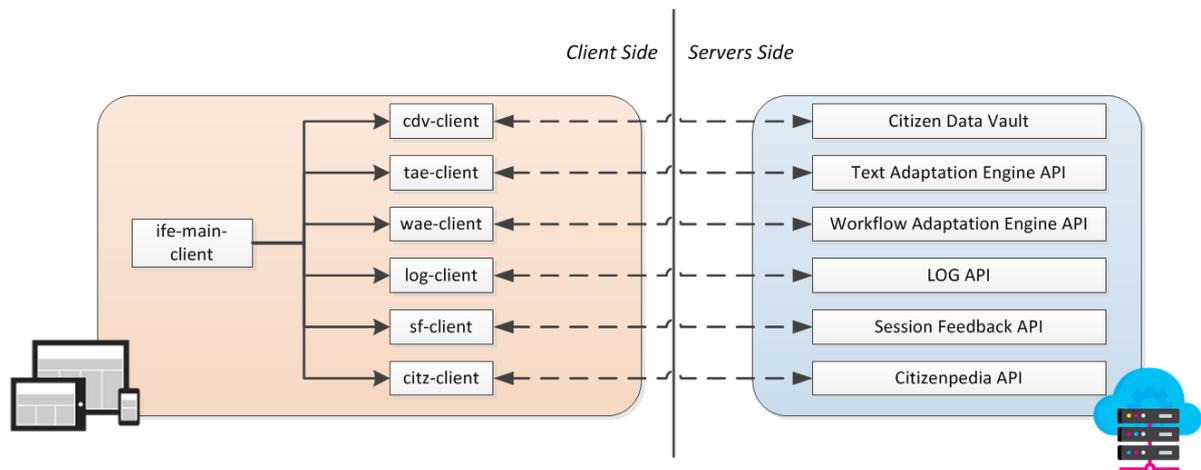


Figure 10 – Components used by IFE

2.3 Next steps

During this second phase, IFE has been developed following a modular approach (as exposed in Figure 10) in order to ease the development and integration of each feature. After defining it, the next steps (related to the quality check) to be followed in the development of this component will be:

- Bug fixes: ensure that the component is as stable and functional as possible.
- More browser tests: test the IFE with more browsers and different versions of them, in order to ensure a successful integration in situations beyond the scope of the project.
- Interaction and user experience enhancement: Start a new iteration of the usability method using the conclusions obtained from the last one.

2.4 Links

What follows are links to the IFE resources as of M24:

- Code repository (GitHub): <https://github.com/SIMPATICOPROJECT/IFE>
- Swagger.io API reference: Not applicable.

3 Interaction Log

3.1 Short summary of key functionality

The Interaction Log component (LOG) is a central repository of information for the interaction matters in the SIMPATICO platform. We will now outline its core functionality and align it with the updated requirements for the v2 of the platform as proposed in deliverable D5.2. Furthermore, it is stated whether there are changes on the accomplishment of these requirements since D3.2.

- Collect information from modules in the architecture [Requirements LOG01] and do so in a fashion that is compatible with the SIMPATICO overall performance [LOG03] **[Requirement already accomplished in D3.2]:**
 - *Interactive Front-End*: from clicks and scrolls to time in different parts of the service.
 - *Session feedback*: textual and quantitative explicit feedback from the users as collected after the execution of the service.
 - *Workflow Adaptation Engine* and *Text Adaptation Engine*: storing metadata from the adaptation processes.
 - *Data Analysis*: DA and LOG are functionally different but share technology. LOG deals with the storing of basic data of the system's interactive functions. DA works by processing these basic data for more advanced functionalities (e.g., statistical processing, trend analytics). The results of this analysis is stored in the same storage module as the LOG but fulfils different requirements and objectives.
- Internally provide a coherent data model that enables SIMPATICO to represent information regarding interaction of users. **[Requirement already accomplished in D3.2]**
- Provide programmatic endpoints (APIs) to insert new data as explained above and to query for existing data. [Requirement LOG02] **[Requirement already accomplished in D3.2]**

3.2 Interfaces

What follows is a recount of the different methods available in the API of the LOG component, as generated by the swagger.io tool. The API follows the RESTful semantics for each of the HTTP methods. This is available with further information (code examples, parameters and error codes) in the link provided in section 5.4.

Table 2 – LOG Interfaces

Method	/find
Type	GET
Description	Finds a document (a JSON file) in the database by words.

Method	/insert
Type	POST
Description	Inserts one document. If in JSON there are '_id' key, the document will be inserted with these id.

Method	/remove
Type	DELETE
Description	Delete one document. JSON with 'id' key is required.

Method	/test
Type	GET
Description	This is a test API to check that the API and the component is up and running. An error code (500) is returned in case there are server errors and a correct code (200) returned in case everything is okay.

Method	/update
Type	PUT
Description	Updates a document's fields. JSON with 'id' and 'content' keys is required. If the field does not exist, it is added (preserving all previous ones).

3.3 Next steps

While the functionality is complete as of the writing of this document, LOG needs to have its APIs fine-tuned to ease the access to particular pieces of data required by external components.

3.4 Links

GitHub repository for the software:

<https://github.com/SIMPATICOProject/logs>

Swagger.io documentation of the API (includes some dedicated to the DA API):

<https://simpatico.hi-iberia.es:4570/simpatico/dist/logs.html>

4 Session Feedback

4.1 Short summary of key functionality

The Session Feedback (SF) is the generator of interactive snippets presented at the end of the interaction for a session in the e-service with the purpose of gathering the user's opinion on the session. The key functionalities and alignment with the requirements presented in D5.2 are as follows. The degree of accomplishment in D3.2/D3.3 is also commented on:

- Exposing an interface to the IFE the interface of SF is presented using a Javascript function. The interface generated is a data capturing form. [Requirement SF02] **[Requirement already accomplished in D3.2]**
- Generate in the backend the logic for displaying the form. This is currently done by sending parameters from the backend so that an appropriate modal form with the required fields is displayed at the user's side. The contents of the form are provided by the system integrator using a configuration file [Requirement SF01] **[Requirement fully accomplished for D3.3]**
- Display the form that was generated. In the implementation this is done by interpreting the parameters sent by the back-end into a JQuery modal dialog box (see 1.2.3) that is presented on top of the legacy UI for the e-service. This is done with the maximum care for usability for the users and in the different devices. [Requirement SF03] **[Requirement fully accomplished in D3.3]**
- Store the results in the LOG so that they can be later on used by the rest of the components in the platform [Requirement SF03] **[Requirement already accomplished in D3.2]**

4.2 Interfaces

What follows is a recount of the different methods available in the API of the SF component, as generated by the swagger.io tool. The API follows the RESTful semantics for each of the HTTP methods.

Table 3 – SF Interfaces

Method	/selectdialog
Type	GET
Description	Select one form session feedback. Answers with the id of session feedback modal to use.

Method	/test
Type	GET
Description	This is a method to check the availability of the API.

4.3 Next steps

Session Feedback will be expanded during the coming months to include better support for longer questionnaires in order to accommodate the post-evaluation questions posed in the pilots' execution (see section 1.2.3). For this, better multi-page breakout of the questionnaires is necessary



4.4 Links

GitHub repository for the software:

<https://github.com/SIMPATICOProject/logs>

Swagger.io documentation of the API (includes some dedicated to the DA and LOG API):

<https://simpatico.hi-iberia.es:4570/simpatico/dist/logs.html>

5 Data Analysis

5.1 Short summary of key functionality

Data Analysis (DA) is the module in charge of interpreting the stored interaction data in the LOG into higher level information that can be used upstream in the eSM. The key functionalities and related requirements (D5.2) are as follows:

- Aggregation of information from the LOG regarding past sessions interaction. For the current implementation, it collects discrete timing measurements for the different interactive elements in the Front-End (specifically, and pending the full detail of the IFE, the time spent in each tab in the Galicia front-end). **[Requirement already accomplished in D3.2]**
- Analysis of this data using statistical methods. For this, the statistical functions in the SciPy library are used to extract average times in different tabs and total visit durations. [Requirement DA01, DA02] **[Requirement fully accomplished in D3.3]**
- Storing the results of the analysis in the LOG using the provided REST API. [Requirement DA01] **[Requirement already accomplished in D3.2]**
- Be able to incorporate new analysis algorithms as defined by the end-users [Requirement DA03] **[Requirement fully accomplished in D3.3]**

5.2 Interfaces

The following two methods are internal helpers to help us estimate the use case KPIs as defined in the project Description of Action. They are related to KPIs concerning the savings in time for users when they are using SIMPATICO.

Table 4 – Data Analysis Interfaces

Method	/reduction-time-spent-all-users
Type	POST
Description	Get increase or decrease percentage between time spent by all users using Simpatico and those who do not use Simpatico. Dates in UTC String

Method	/reduction-time-spent
Type	POST
Description	Get increase or decrease percentage between time spent by users using Simpatico and those who do not use Simpatico. Dates in UTC String

The following two methods are also helpers for the calculation of KPIs. In this case, they estimate, based on data stored in the platform, the percentage of users that complete fully an e-service execution session with SIMPATICO and without SIMPATICO.

Table 5 - Data Analysis Interface for calculation of KPIs

Method	/percentage-complete-autonomously
Type	POST
Description	Get increase or decrease percentage between users that fill out completely the form using Simpatico and those who do not use Simpatico.

Method	/percentage-complete-autonomously-all-users
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Type	POST
Description	Get increase or decrease percentage between users that fill out completely the form using Simpatico and those who do not use Simpatico.

Method	/sendUserProfile
Type	POST
Description	Using this POST call, UPM sends a User Profile for storing in DA/LOG.

5.3 Next steps

Data Analysis is a component particularly in need of continuous improvement so that it could fulfil the emerging needs for analysis by civil servants or by the SIMPATICO developers themselves (i.e., to calculate internal project KPIs). As of the writing of this document the coverage of KPIs is partial for Galicia and has not yet started for the rest of pilots. It is expected that these new analytics and access APIs will be built and documented along the process in the swagger.io API linked to in the next section.

5.4 Links

GitHub repository for the software:

<https://github.com/SIMPATICOProject/logs>

Swagger.io documentation of the API (includes some dedicated to the LOG API):

<https://simpatico.hi-iberia.es:4570/simpatico/dist/logs.html>

6 e-Service Monitor

6.1 Short summary of key functionality

The e-Service Monitor (eSM) is the component that provides a dashboard for the Civil Servants to understand the collected data generated by Citizens during the execution of e-services. It enables Civil Servants to visualize the kind of information that is captured from the interactive components in an easy manner. It also enables the fine-tuning of some modules' output (e.g., the TAE) by using the expert's input to validate the results provided by the automated stages. The specific functionalities and addressed requirements are as follows:

- eSM supports atomic analysis and filtering capabilities that compose data coming from DA into a more manageable visualization for the Civil Servant [Requirement eSM01]. **[Requirement accomplished in D3.3]**
- eSM is built as a web application that enables Civil Servants to run the monitor in parallel with the regular e-service [Requirement eSM02]. **[Requirement fully accomplished in D3.3]**
- eSM supports Civil Servant inputs to enable better functionalities and also that complement the inner working of other SIMPATICO modules (e.g. the TAE) [Requirement eSM03]. **[Requirement accomplished in D3.3]**

6.2 Interfaces

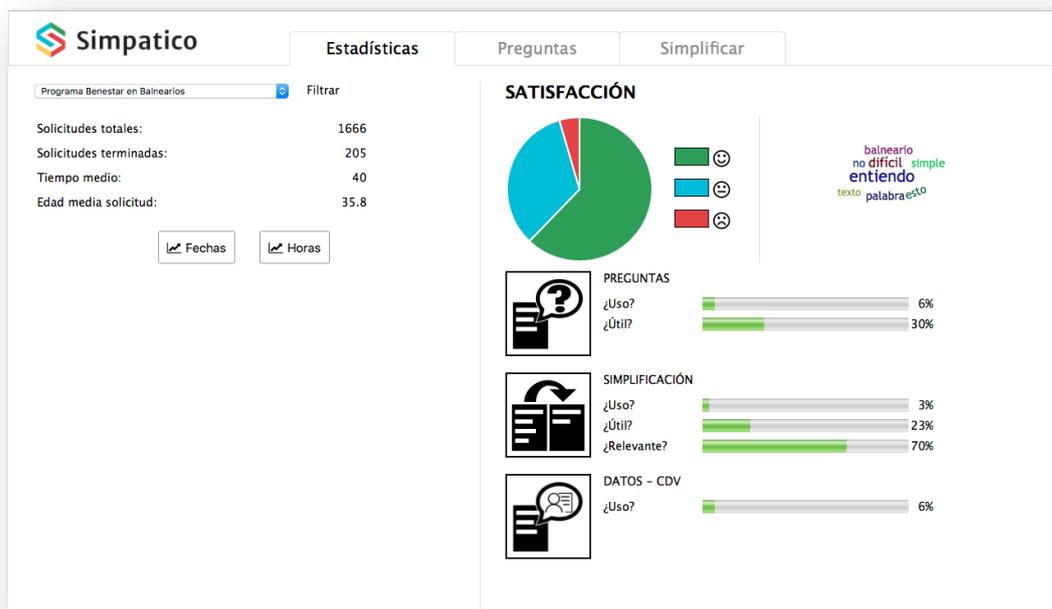


Figure 11 – Screenshot of current eSM implementation

The eSM component is primarily a User-facing component and so it does not provide any RESTful external interfaces. Rather, and as explained in section 1.2.4, it operates using the data available in the LOG and DA. As such, no external interfaces are needed.

6.3 Next steps

Upon the writing of this document, eSM is still undergoing the transition from pure mock-up to real front-end development. When a first operative version and development is ready it will be circulated among the rest of the pilots to gather new requirements from the civil servants involved so that the monitor is more complete.

6.4 Links

GitHub repository for the software:

<https://github.com/SIMPATICOProject/logs>

(GitHub repository to be separated for eSM)

eSM does not present an API so there is no swagger.io link.

7 Conclusion

In this deliverable, we have summarised the updated WP3 components developed for SIMPATICO in the period spanning project months M12 and M24. This presents the status of the components prior to their finalisation for the second iteration of evaluations to be undertaken during the year 2018.

In this period we have redesigned taking into account three main axes of updates:

- The refinement of what was delivered in the first iteration and which worked without major issues or needs for updates. Here we can single out the IFE and LOG, which performed well in the first iteration and whose changes are mostly maintenance fixes to keep the modules working.
- The evolution of some of the modules to meet redesigns and new requirements proposed by the consortium in this period and formalised in the deliverable D5.2 which presented the new architecture and requirements of the SIMPATICO platform. Here the components mainly affected are SF and DA. These components were working in the first iteration, but the proposed approach was deemed insufficient and so they underwent some redesigns to meet new requirements.
- Finally and related to the prior point, components that not only required a redesign but also upon closer inspection were detected to be better served by a redesign that included the end-users in a more central manner. Thus, a strategy for co-design of the component along with the end-users was selected for the e-Service Monitor (eSM).

In parallel to the redesign of the modules, we have also been active in the redesign of the interaction model that holds the overall interactive flow of the SIMPATICO system together. The main addition has been the incorporation of the user feedback loop that makes such information available to actors in the platform such as Civil Servants. This was required to integrate the results of the SF and CPD components into the model.

The overall end result of these activities has been a reformulation of the interactive components of the platform. In the coming months following this report, the components will be implemented and integrated for use in the SIMPATICO Y2 pilots.

7.1 Next Steps

All tasks in WP3 continue during Year 3 of the project:

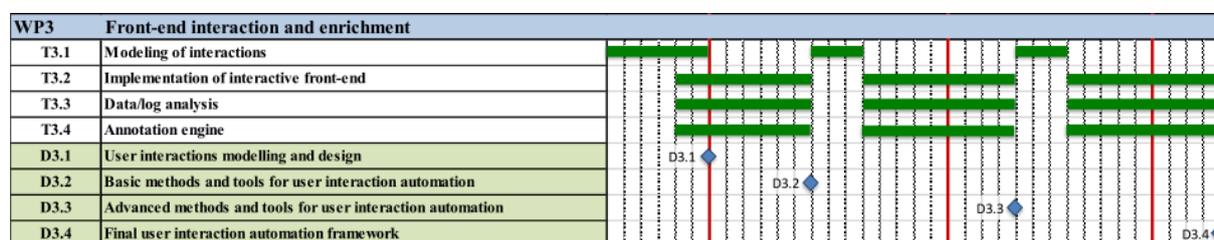


Figure 12 – Tasks in Work Package 3

As we can see, there is still activity in tasks T3.1 through T3.4 which is documented in a final deliverable in M36. This is a somewhat different scenario to the current document since it is not followed by an integration phase and an evaluation of the components. So, the objectives and general planning of the M24-M36 period and the D3.4 is different to those of D3.2 and D3.3.

It is expected that the goals for the WP3 in this period are as follows:

- Finalisation and maintenance of the current components described in this report. Especially during the execution of the pilots' evaluation, bugs will be detected and changes might be needed in the implementation of the modules. This will be addressed as part of the WP3 activities.
- In light of the success of the co-design activity for the eSM documented in section 1.2.5 of this report, further consultations, questionnaires and focus groups on the perception of the designs by users will be organized. These activities, which will be carried out in collaboration with WP6 and the engagement plan presented in (Pistore, D6.4 Citizens & Stakeholders engagement & community building plan v2 2018), are expected to generate a list of change requests. Some of these will be in time to be addressed in minor redesigns, as mentioned in the previous point, while some others will be left outstanding at the end of the project and will be reported for future activities such as post-project exploitation.
- Together with our activities in WP7, establish definite pathways to exploitation of the individual WP3 components that can be of use beyond SIMPATICO. This will be mainly documented in WP7 but features that may help such exploitation will be developed in the scope of WP3.

8 References

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